

*The Transit of Mercury, 1907 November 14.**(Communicated by R. T. A. Innes.)*

At Johannesburg, at ingress, thin clouds obscured the Sun and made observation difficult; at egress the Sun was cloudless except for a few moments just before external contact.

At Pretoria the Surveyor-General organised a party, but clouds prevented any useful observations.

The observations made here are tabulated below. The individual observers' reports are as follows:—

Mr. R. T. A. Innes, using a 9-in. refractor by Grubb, with a sun-diagonal eyepiece:—

When I looked at the Sun at  $15^h 46^m 4^s$  sid. (clock) T. Mercury was already about  $\frac{1}{8}$  on. At the time of internal contact rather thick clouds were passing, but the planet was never invisible. Internal contact took place, as nearly as I could estimate, at  $15^h 47^m 48^s$ , but it was possibly a few seconds later. Heavy clouds passed for a few seconds, making confused definition. At  $15^h 48^m 1^s$  the sky cleared, but contact was passed and the planet clear of the limb by  $\frac{1}{8}$  part or so. Before egress the planet was carefully scrutinised; it was a mere circular black dot, without any shading; definition was perfect, the Sun's limb being without a trace of serration. Second internal contact was at  $19^h 8^m 56^s$  and was good; last contact at  $19^h 11^m 36^s$  was fair, as some thin clouds were passing.

Mr. W. M. Worssell, M.B.A.A., took part in the observations with his 3-in. refractor and a direct-vision eyepiece:—

Ingress: definition was very bad, a decided line was seen at  $15^h 47^m 59^s$  sid. T. Egress: suspected black drop at  $19^h 8^m 48^s$ , certain black drop at  $19^h 8^m 51^s$ ; contact passed at  $19^h 9^m 0^s$ , external contact at  $19^h 11^m 27^s$ . Definition medium.

Mr. J. Innes, 3-in. refractor, direct-vision:—

Dark glass split during observations, observations uncertain. Internal contact at egress  $3^h 46^m 41.5^s$  stand. clock T., egress  $3^h 49^m 1.5^s$ . One-quarter weight has been given to these observations.

Mr. H. E. Wood, M.Sc.  $2\frac{1}{8}$ -in. refractor (Rheinfelder & Hertel), direct-vision:—

Good definition, image small; internal contact at egress good,  $19^h 8^m 56^s$  sid. T., last contact at  $19^h 11^m 25^s$  more uncertain.

For the timing arrangements, electrical sounders, connected with the sidereal clock, were placed near the observers. The clock had

been rated by star observations with a transit instrument for five weeks preceding the 14th November, and had a steady rate of 0.28 seconds per day losing. Its correction at 16 hours S. T. on November 13 was +0.56 seconds. Cloudy weather prevented the observation of time stars on the 14th and 15th, but from the clock rate the corrections at the times of observations of the transit on the 14th are +0.84 seconds at ingress, +0.88 seconds at egress. The mean time clock was rated by comparisons with the sidereal clock, and its corrections are -1.3 seconds at ingress, -1.2 seconds at egress. When the corrections are applied to the above times, reduction to Greenwich mean time made, and the following reductions to the centre of the Earth applied, ingress internal contact +3.4<sup>s</sup>, egress internal contact +30.9<sup>s</sup>, external contact +31.2<sup>s</sup>, we have :—

Observer.	Telescope.	Phase.	Geocentric Greenwich Mean Time.		
			h	m	s
R. T. A. Innes ...	9-in.	II.	22	26	4.8
W. M. Worssell ...	3-in.	II.	22	26	15.8
R. T. A. Innes ...	9-in.	III.	1	47	7.5
* W. M. Worssell ...	3-in.	III.	1	47	7.0
J. Innes ...	3-in.	III.	1	47	11.1 $\frac{1}{4}$ weight
H. E. Wood ...	2 $\frac{1}{8}$ -in.	III.	1	47	7.5
R. T. A. Innes ...	9-in.	IV.	1	49	47.3
W. M. Worssell ...	3-in.	IV.	1	49	38.4
J. Innes ...	3-in.	IV.	1	49	31.5 $\frac{1}{4}$ weight
H. E. Wood ...	2 $\frac{1}{8}$ -in.	IV.	1	49	36.4

Results of Johannesburg observations :—

	Obs.	Nov. 1907.				N.A. O - C.	
		d	h	m	s	s	s
Internal contact at ingress	2	13	22	26	10.3	18	-7.7
„ „ „ egress	4	14	1	47	7.6	17	-9.4
External „ „ „	4	14	1	49	40.0	58	-18.0

The direct-vision observers using the 3-in. telescope had six sun-glasses either blistered or cracked during their observations.

\* Mean of “certain black drop” and “contact passed.”

*Johannesburg Observatory :*  
1907 November 15.

*Observations of the Transit of Mercury, 1907 November 14*  
By E. T. Whitelow.

Made at Birkdale, Lancashire.

Long. W.  $3^{\circ} 1' 37''$ .

Lat. N.  $53^{\circ} 26' 48''$ .

Neither ingress nor egress was observed, owing to clouds.

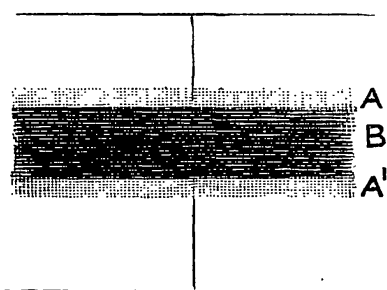
A. *Direct Observations* were made with  $7\frac{1}{8}$ -in. refractor, stopped down to 4-in. A Thorp's polarising eyepiece: power 150. At 12h. 15m. G.M.T., Mercury showed a clean cut, round disc, with no indication of halo or bright spots. The duration of observation was half a minute or so of bright sunshine, and intermittent observations of a few seconds at a time when the Sun was slightly obscured by cloud, perhaps 2 minutes in all.

At 2h. 20m. there was a sudden burst of bright sunshine in a patch of clear blue sky. I put the edge of the Sun just outside the field of the eyepiece, uncrossed the prisms of the eyepiece so as to get the maximum light, and found Mercury in the field. It had much the appearance of Venns when in inferior conjunction, viz. a very thin curved line of light extending about  $120^{\circ}$  round the planet. There was no trace of this on the side away from the Sun, nor could I see *any* trace of the dark portion of Mercury contrasted against the sky.

B. *Spectroscopic Observation.* 12h. 48m. G.M.T.

Instrument  $3\frac{1}{2}$ -in. refractor, Brashear grating, 15,500 lines per inch; 1st order. Power 120 and 180.

The planet was observed on the Sun's disc only, with the slit parallel to the direction of diurnal rotation. Along the centre of



the spectrum was seen a shaded band, consisting of a dark central band B, bordered by slightly lighter margins A, A'. Each was about  $\frac{1}{4}$  the width of the central darker band when Mercury was bisected by the slit. To make sure these were not due to dust lines, I pulled the clock slow-motion cord to and fro, and found these margins travelled with Mercury along the slit. I also slightly increased the opening of the slit, to clear it of any possible effect from dust lines. When I moved the telescope up or down in